

Passive Exoskeleton for Augmentation and Rapid Logistics (PEARL)

DEBEL has developed the state-of-art wearable exoskeleton systems that augment the capability of the soldier to carry more weight and enhance his endurance. These structures are coupled with the human and move synchronously with the user. The primary objective for development of passive exoskeleton system (PEARL) is to transfer the loads carried by an individual, as a backpack, directly to the ground. The aim is to reduce the compressive loads in the spine and lumbo-sacral joints during walking on even and uneven terrains at faster speeds or for longer distances. This will in turn reduce the risk of musculoskeletal injury, increase the payload capacity and improve the endurance.

Salient Features

i.	Biomechanical Activity	Standing, walking on even and uneven surfaces.
ii.	Weight of PEARL	≤ 5kg
iii.	Payload Capacity	15 kg of backpack load
iv.	Walking Speed	Up to 5 kmph
v.	Walking Terrains	Walking possible on any even and uneven terrains
vi.	Compatibility with combat gear, rucksack and shoes with exoskeleton	Designed, tested and evaluated for <ul style="list-style-type: none"> • Any type of backpack (shoulder rucksack) load of 15 kg along with combat gear with weapons • Any type of shoes in service use during walking
vii.	Anthropomorphic Variability	Anthropomorphically modular design having adjustability from 5 th to 95 th percentile (160cm – 190 cm) of variation in height
viii.	RoM	Unobtrusive to human natural walking
ix.	Advantages	a. The system has a capacity to offload a maximum of 75% weight of the backpack payload to ground thereby reducing the risk of radiculopathy and lower back spinal injuries b. Donning time of <30 seconds and Doffing time < 15 seconds



1. Interested Companies/industries are requested to apply against this EoI to the following address:-

**To,
The Director,
Defence Bioengineering & Electromedical Laboratory
CV Raman Nagar, Bangalore-560 093
Email- director.debel@gov.in**

2. A copy of interest may be sent to the following address without any attachment:-

**To,
The Director,
Directorate of Industry Interface & Technology Management (DIITM)
Room No. 447, DRDO Bhawan Rajaji Marg, New Delhi-110 011
Email-diitm.hqr@gov.in**

List of Support documents to be attached with EoI:-

- (a) Memorandum and Articles of Association (Should be incorporated as per Indian Companies Act, as amended time to time).
- (b) Certificates of registration as a manufacturing unit, if any.
- (c) Audited Balance Sheet for the preceding three years.
- (d) Income Tax returns for the preceding three year period.
- (e) Details of shareholding/ownership pattern especially foreign partners/shareholders, foreign employees, directors, etc. The company must adhere to the prevailing Govt of India policies and regulations on Foreign Direct Investment (FDI)/ DIPP norms as applicable.
- (f) Annual budget for R&D during last three years.
- (g) Numbers and details of IPR or patents, etc., held by the company.
- (h) Number of technically or professionally qualified personnel.
- (i) Record of past performance (e.g., Supply orders executed against of Ministry of Defence orders, Public Sectors and Paramilitary Forces, if any).
- (j) Availability of adequate infrastructure (List of machines and their production capacities) and technical expertise.
- (k) List of Testing and Support equipments.

- (l) ISO/ ISI certification or any other certification.
- (m) Relevant clearances form the authorities/ ministries (if any).
- (n) Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.
- (o) Capacity/capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.
- (p) PESO and DPIIT license for explosive handling if ToT is for high energy Material, explosives, propellants, and component/ system dealing with it etc.
- (q) Under taking form company seeking ToT that none of its Directors, Independent Directors, non-executive Directors, Key management personnel are involved in any corrupt practices, unfair means and illegal activities.
- (r) Details of the industries license for Defence manufacturing be provided by the industry seeking ToTs.